Grand Island Stormwater

Guidance: Sizing Criteria for Storm Infrastructure

Stormwater retention and treatment installations are sized according to their drainage basin to manage runoff volumes and reduce pollutants. There are a few accepted ways to calculate the size of an installation to maximize efficacy and minimize costs. Generally, these methods are intended to control the volume or flow velocity for most of the annual precipitation events.

Grand Island City Code

Developed land in Grand Island must have the same ability to retain the volume of a 10-year storm after construction is complete as it did before construction began.

New developments must be able to provide water quality treatment all events less than or equal to an 80th percentile rain event. Re-development projects must be able to provide water quality treatment up to and including a 70th percentile rain event.

	10-year storm[1]	80% Event[2]	70% Event[2]
Grand Island	4.17”	0.72”	0.53”

1 National Oceanic and Atmospheric Administration (NOAA) National Weather Service Office of Water Prediction (OWP). https://hdsc.nws.noaa.gov/pfds/ Accessed August 2024.

2 FHU. *Nebraska H2O Post-Construction Stormwater Program Design Standards and Procedures Memorandum*. August 2015.

Hydromodification Design Methods

Hydromodification design is intended to minimize impacts from higher runoff volumes and flow rates. The objective is to closely match an area’s post-construction flow rate discharge to that of pre-construction. For this design, models are run to simulate pre-construction flow rates for a 10-year storm, or the rainfall intensity at which 10% (1/10) of historical rainfall intensities are equal to or greater than, with a 10% likelihood of any storm in one year exceeding that intensity. The post-construction discharge rates cannot exceed these pre-project rates and durations. See https://hdsc.nws.noaa.gov/pfds/ for the most up-to-date data.

Volumetric Design Storm Method

The volumetric design storm method is intended to size a stormwater control measure so that it is able to capture the volume of runoff generated from a specific rain depth that falls onto a defined area. The depth is approximated by ranking several years of 24-hour rainfall data and calculating the depth at which a 80% of the storms are smaller. The use of the 80th percentile design storm (the depth at which 80% of the daily or 24-hour storms on record are equal to or smaller) is based on research showing that more frequent, smaller storms have the greatest amount of pollutants. The design storm depth is multiplied by the drainage area and a runoff coefficient, the latter of which represents a fraction of the rainfall that becomes runoff (often 0.9 for impervious surfaces). The storage within the stormwater control method – including within the void space of the media, ponding zone, or open space – must be large enough to hold this design storm volume.

References

Office of Water Programs and California State University, Sacramento. *Guidance for Stormwater and Dry Weather Runoff CAPTURE at Schools*. Appendix B. December 2018.

Utah Department of Environmental Qualtiy, Division of Water Quality. *DWQ Guidance for Calculation of 80th Percentile Storm Event*. March 2021.